NULL OBJECTS IN MANDARIN CHINESE

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1. Introduction.

In Mandarin Chinese, as is well known, objects can be omitted, and in this regard, Mandarin has been included in typologies of languages which are best known for exhibiting implicit arguments, like Korean, Thai, Italian, and Portuguese (Cole (1987)), (Rizzi (1986)). Consider (1) as an example.

(1) Xiaomei$_i$ renwei Zhangsan bu xihuan e_i.
Xiaomei$_i$ think Zhangsan not like e_i
'Xiaomei thinks that Zhangsan doesn't like [her].'

While the assessment of neither null subjects nor null objects is final, it has widely been agreed that Mandarin is a pro-drop language in that null subjects, in at least some types on constructions, are pronominal.[1] There is less agreement on null objects. A debate has been going on about the analysis of null objects with respect to GB binding theory, out of which have developed two positions, one represented by C.-T. James Huang and the other by Xu Liejiong, D. Terence Langendoen, and Zhang Shi. Basically, Huang (1984, 87) claims that null objects appear only in topic constructions, where they are interpreted as variables bound by the topic. Xu and Langendoen (1985) and Xu (1986) believe that null objects have a wider distribution, and are always pronouns. Thus, both the distribution and identification of null objects is not yet fully understood. This paper is intended to address these two issues from the perspective of the binding theory for Mandarin Chinese in the Head-driven Phrase Structure Grammar framework. I will take an independent position by suggesting that Mandarin has a "mixed" object system, where null objects are not always identified as having the same reference, but rather are pronominal in certain cases and nonpronominal in others. In doing so, I support Xu's treatment of null objects with respect to their distribution and their identification as pronominal in certain types of constructions, while also supporting Huang's view that null objects are nonpronominals in topic constructions. My position is based on field work done on three kinds of constructions: non-topic constructions (where the object is coindexed with a matrix subject), discourse constructions (where the object is coindexed with an NP contained in a previous utterance in the discourse), and topic constructions (where the object is coindexed with a topic).[2] Typical examples of each are shown below; the non-topic construction is in (1), and the discourse and topic constructions are in (2) and (3), respectively.

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[1] An example is the following:

Lisi$_i$ yiwei e_i kaoshi bu jige.
Lisi$_i$ think e_i exam not pass
'Lisi thinks that [he] didn't pass the exam.'

[2] My field work consisted of interviews with six informants, who are from the following areas: Guangxi province, Jiangsu province, Xinjiang province, and Taiwan. There was a wide range of native dialects. However, only one of these informants was a true (L1) Mandarin speaker. There are relatively few L1 speakers in the general population of Mandarin speakers.

(2) [Neiben shu]$_i$ hen gui. Mai dao e_i de ren dagai you qian.
[that-CL book]$_i$ very expensive. buy ASP e_i DE person probably have money
'That book is expensive. People who have bought [it] must have money.'

(3) [Neiben shu]$_i$, duguo e_i de ren hen duo.
[that-CL book]$_i$ read-ASP e_i DE person very many
'That book, there are many people who have read [it].'

There are numerous examples that show the acceptability of null objects in all three types of constructions. I will argue that null objects in non-topic and discourse constructions are pronouns, and in topic constructions, traces.

2. HPSG binding theory

2.1. Binding theory for Chinese.

Before considering the data, I review briefly the key concepts of the HPSG general binding theory and the principles of the theory which are particular to Chinese. In contrast to GB binding theory, HPSG binding theory is based on the relative obliqueness of grammatical relations, and is only partially formulated in terms of configuration. The fundamental concept that captures this is the o(bliqueness)-command relation, which is defined in terms of the less-oblique-than relation, an abstract ordering of dependents of the same head which is formally indicated in the order of items in a SUBCAT list (where an item further to the right is less oblique). SUBCAT here includes the subject as in Pollard and Sag (1987, in press).

Local o(bliqueness)-command:
Let Y and Z be *synsem* objects with distinct LOCAL values, and Y be referential.[3] Then Y locally o-commands Z just in case Y is less oblique than Z.

O-command:
Let Y and Z be *synsem* objects with distinct LOCAL values, and Y be referential. Then Y o-commands Z just in case Y locally o-commands X dominating Z.

Notice that local o-command is just a sub-relation of o-command. Since X always dominates itself, a paraphrase of these relations would be as follows: Y locally o-commands all of the less oblique complements of the same head, that is the less oblique NPs on the same SUBCAT list, and it o-commands everything contained in those complements.

Another key idea of the binding theory is o-binding, which can be defined as follows:

O-binding:
Y (locally) o-binds Z just in case Y and Z are coindexed and Y (locally) o-commands Z. If Z is not (locally) o-bound, then it is said to be (locally) o-free.

A paraphrase of this would be: Y locally o-binds all of the less oblique complements of the same head which it is coindexed with, and it o-binds anything which it is coindexed with and which is contained in one of those complements.

Another aspect of HPSG which is relevant to the binding theory is the classification of

[3] In HPSG, "referential" means nonexpletive. Thus, both quantificational and non-quantificational NPs count as referential NPs. Coindexed NPs (i.e. NPs whose INDEX values are token-identical) have the same reference (or covary overt the same domain of quantification).

NPs (sorts of nominal-objects) according to their referential properties. For Chinese, there is a three-way distinction: z-pronouns (zpro), personal pronouns (ppro), and nonpronouns (npro). The binding theory distinguishes these reference types according to their behavior with respect to the concepts above, (local) o-command and o-binding.

Now, for the principles of the binding theory which are particular to Chinese.

Binding theory for Chinese:
Principle A. A z-pronoun with a referential o-commander must be o-bound.
Principle B. A personal pronoun must be locally o-free.
Principle C. A nonpronoun must be o-free.

A paraphrase of Principle B is as follows: a personal pronoun cannot be coindexed with a less oblique dependent of the same head, or in other words, by an item to the left on the same SUBCAT list. A paraphrase of Principle C is as follows: a nonpronoun cannot be coindexed with anything which is on the SUBCAT list of the verb that governs it, or of any superordinate verb. These two principles are conditions in the general binding theory of HPSG, which accounts for other languages such as English.

Principle A, on the other hand, is motivated by Chinese in particular. It is a condition on what Pollard (ms.) calls a z-pronoun, which for Mandarin signifies the long-distance anaphor *ziji*. This condition is identical to the condition on anaphors in the theory, except that it permits both local and nonlocal binding, whereas the condition on anaphors permits only local binding. Due to the nature of z-pronouns, this new reference type fills a gap in the general typology of NPs in HPSG binding theory. Where the binding theory of Pollard and Sag (1992, in press) includes two reference-types which must be o-free (locally or nonlocally), but only one type which must be o-bound (locally), it now includes two reference-types which must be o-bound (both locally and nonlocally).

2.2. NP typology for Chinese.

An HPSG NP typology for Chinese is as of yet inconclusive, due to the unresolved problem of the identification of empty subjects and objects. Since only null objects are the focus here, I will not discuss where null subjects fit into this typology. Instead, I will present a typology for Chinese overt or null object NPs.

HPSG REF-TYPE	ppronoun	nonpronoun	zpronoun
OVERT	ta	Xiaomei	ziji
EMPTY	?	?	--

There is a suitable example for each of the three types of overt objects, but how do null objects fit into this typology? The last two principles of the binding theory laid out in the previous section should determine whether null objects are personal pronouns or nonpronouns.[4] If a null object is a personal pronoun, then it is treated just as an overt pronoun in HPSG except with no phonological content. If a null object is a nonpronoun, then it is treated as a trace whose filler is a nonpronoun. This is because in HPSG, traces appear in filler-gap constructions, where the LOCAL value of a trace is structure-shared with that of the filler, and thus the reference-type of a trace depends on that of a filler. In

[4] There is no motivation for considering a null object as a z-pronoun, since an o-commanded null object need not be bound by a superordinate argument (it can have a discourse antecedent).

this paper, only fillers which are nonpronouns are considered.

Huang (1984, 87) posits that a null object is bound by a topic or by a null topic operator which is coindexed with it, and is identified, in GB terms, as a variable, which corresponds to a trace in HPSG. Xu, on the other hand, claims all null objects (and subjects) are pronouns.

In considering the three types of constructions at hand, a determination has to be made about which HPSG reference-type a null object is in which constructions.

3. Non-topic constructions.

3.1. Two views.

It is on non-topic constructions that the two opposing views differ most, particularly those where the null object is coindexed with the matrix subject. Huang (1982, 84) claims that the distribution of null objects does not include this type of construction. He says null objects can only be bound by a topic or a relative head, so-called A-bar positions.

Xu (1986), on the other hand, claims that null objects do appear in this kind of construction. Zhang (1988) supports this position.

In an attempt to determine which analysis is more desirable, I will consider examples from each position along with some others.

3.2. Data.

The first two examples are taken from Huang (1984, 87).

(4) Zhangsan$_i$ xiwang Lisi keyi kanjian e_i. 1984, (22b)
Zhangsan$_i$ hope Lisi able-to see e_i
'Zhangsan hopes Lisi can see [him].'

(5) Zhangsan$_i$ shuo Lisi bu renshi e_i. 1987, (19)
Zhangsan$_i$ say Lisi not know e_i
'Zhangsan says Lisi doesn't know [him].'

Huang, as well as my informants, finds these examples grammatical with appropriate contexts, with the indicated readings (even though a more likely interpretation is one where the antecedent of the null object is a discourse referent whose reference is different from *Zhangsan*). Huang claims that even though the null object may be coindexed with the matrix subject in (4) or (5), the antecedent of the null object in both cases is not the subject but, instead, a null topic which has the same reference as both. Consider the structure below.

(6) [$_{\text{Topic}}$ e_i], [Zhangsan$_i$ shuo Lisi bu renshi e_i.]

The structure of (6) comes about in the following way: the null object moves into topic position and is coindexed with an NP in the previous sentence by a discourse predication rule, and then the topic is deleted due to discourse redundancy. Huang (1987) argues that the null topic is interpreted from the previous discourse due to the application of discourse and pragmatic conditions (which accounts for the function and interpretation of topics in discourse, among other things), which occurs after the application of the GB binding theory. The ordering of these applications permits the null object to be interpreted as a variable, even though it can only be interpreted as pro by the binding theory (since at the time of applying the binding theory, there is a possible binder in an A-position). The discourse and pragmatic conditions which Huang refers to are crucial to

his analysis of Chinese, which he claims contributes to the "discourse-oriented" quality of Chinese, as opposed to "sentence-oriented" languages like English.

Huang's analysis, as just illustrated, is motivated by the fact that he finds examples like (4)-(5) ungrammatical if uttered out of the blue, that is, without a previous relevant discourse (i.e. without previous reference to the element referred to by the null object). (Since a null topic is considered to have its reference fixed in a given discourse, positing a null topic assumes a previous discourse, and thus ensures that examples like (4)-(5) are interpreted with contexts.) This observation brings out an asymmetry between null objects and null subjects in this respect, where an example like (7) is considered grammatical (by Huang) when uttered out of the blue, unlike (5) (or (4)).

(7) Zhangsan$_i$ shuo e_i bu renshi Lisi.
Zhangsan$_i$ say e_i not know Lisi
'Zhangsan says [he] doesn't know Lisi.'

The judgments of my informants confirm this observation, yet I do not have an explanation for it at this time. However, there is evidence to show that this out-of-the-blue asymmetry is not always the case; there is a symmetry between null object and null subjects in some out-of-the-blue utterances, as illustrated by (7) and the example below, taken from Xu (1986).

(8) [Neige haizi]$_i$ yiwei mama yao zeguai e_i le.
[that child]$_i$ think mother want reprimand e_i ASP
'That child thinks that her mother is going to reprimand her.'

(8) is considered by my informants and Xu to be grammatical out of the blue as well as with an appropriate previous discourse, just like (7). Huang does not acknowledge examples like (8).

Furthermore, Huang disregards another type of example (where the null object appears in a relative clause), despite the fact that he (and my informants) finds it grammatical out of the blue as well as with an appropriate previous discourse. An example is shown in (9).[5]

(9) [Neige gu-er]$_i$ zhaobudao yuanyi fuyang e_i de ren. 1984, footnote 10
[that-CL orphan]$_i$ not-find willing adopt e_i DE person
'That orphan can't find someone/anyone who is willing to adopt [her].'

For this, he uses the following reasoning: the interpretation given above in (9) can be "pragmatically inferred" in a non-"neutral" context, unlike his "ungrammatical" examples (4)-(5) above (which are interpreted in "neutral contexts"), and thus does not serve as significant data for the analysis of null objects in Mandarin.

I believe there are at least four problems with Huang's analysis. The first is that positing a null topic for examples like (4)-(5) seems unnecessarily complicated. Second, Huang's reasoning for disregarding examples like (9) is unclear. He does not explain in what sense a context in (9) is not neutral, while contexts for the other examples are. Moreover, Huang does not make it clear how neutrality of contexts is related to out-of-the-blue utterances. He seems to suggest that non-neutrality involves an inference taken from a verb in the utterance (namely *fuyang* in (9), which allows (9) to be interpreted out-of-the-blue). Why this non-neutrality qualifies examples like (9) as insignificant is not made

[5] In order to fully understand the difference in grammaticality between (9) and (4)-(5), as well as between (7)-(8) and (4)-(5), an investigation of the grammaticality of these examples with respect to specific contexts would be necessary.

clear. Huang's arguments do not seem to be based on conventional means of distinguishing what is and is not significant syntactic data. Thus, this line of reasoning does not give a strong case for the set of judgments that Huang gives for these sentences. Third, by not acknowledging examples like (8), Huang fails to acknowledge a symmetry between null subjects and null objects in out-of-the-blue utterances, (as shown between (7) and (8)). Fourth, by interpreting examples like (4)-(5) as topic constructions, while interpreting examples like (7) as non-topic constructions, Huang does not account for the symmetric behavior of null objects and null subjects with respect to acceptance in appropriate contexts, (as shown between (7) and (4)-(5)). By attempting only to account for out-of-the-blue utterances, Huang does not acknowledge this symmetry.

The next examples, from Zhang (1988), are considered grammatical with contexts by both my informants and Zhang. (These are very similar to (4) and (5), respectively.)

(10) Zhangsan$_i$ huaiyi Lisi kanjian le e_i. (4)
Zhangsan$_i$ suspect Lisi see ASP e_i
'Zhangsan suspects that Lisi has seen [him].'

(11) Zhangsan$_i$ shuo Lisi bu xiangxin e_i. (2b)
Zhangsan$_i$ say Lisi not believe e_i
'Zhangsan says that Lisi doesn't believe [him].'

The following three examples are from Pollard (ms.). Of these, the last two correspond closely to examples cited as grammatical by Xu and Langendoen (1986) (their (11) and (12)). All three are considered by my informants to be grammatical with or without appropriate previous discourses.

(12) [Liangge houxuanren]$_i$ dou yiwei yonghu e_i de bi fandui e_i de duo.
[two-CL candidates]$_i$ all think support e_i DE compared-to oppose e_i DE many
'The two candidates both think that there are more people who support [them] than who oppose [them].'

(13) [Fu zongtong]$_i$ yiwei yonghu e_i de bi fandui e_i de duo.
[vice president]$_i$ thinks support e_i DE compared-to oppose e_i DE many
'The vice president thinks that there are more people who support [her] than who oppose [her].'

(14) Zhangsan$_i$ cengjing zhudong yaoqiu bieren piping e_i.
Zhangsan$_i$ formerly initiate demand other-people criticize e_i
'Zhangsan has voluntarily asked other people to criticize [him].'

(10)-(14) give more evidence for the acceptability of null objects which are coindexed with matrix subjects both with or without previous discourses. My informants' judgments are consistent with those of Huang, Xu and Langendoen, and Zhang, as well as Pollard's informants. However, there is a difference in analysis. While Xu and Langendoen, and Zhang all claim that the matrix subject is the binder in each case, Huang believes a null topic is the binder. The reason for this difference in opinion is based on the fact that the first three acknowledge examples like (8)-(9), while Huang does not. It seems as if Huang's sense of what constitutes significant data is different from the others'.

3.3. Analysis.

According to the binding theory given in 2.1., the null object in each example above can only be analyzed as a personal pronoun. Consider, for example, (5), which is shown again here.

(5) Zhangsan$_i$ shuo Lisi$_j$ bu renshi e_j.
Zhangsan$_i$ says Lisi$_j$ not know e_j
'Zhangsan says Lisi doesn't know [him].'

The SUBCAT values of the verbs *renshi* and *shuo* are as follows:

renshi: [SUBCAT < NP$_j$, NP$_i$ >]
shuo: [SUBCAT < NP$_i$, S >]

Notice that the null object is locally o-free, since the other NP in *renshi*'s SUBCAT list (*Lisi*) does not bind it. Instead, it is (nonlocally) o-bound by *Zhangsan*, which is not included in that SUBCAT list. Therefore, the null object can be interpreted as a ppro, without violating Principle B of the binding theory. Since the null object is (nonlocally) o-bound by *Zhangsan* (*Zhangsan* o-commands the S which contains the null object), then it cannot be a npro, according to Principle C (nonpronouns must be o-free). Consequently, the null object is identified as a ppro, and is treated in HPSG just like an overt personal pronoun except with no phonology. (This, however, does not entail that overt and null personal pronouns behave the same, as will be seen in section 4.)

The other examples are analyzed in an analogous fashion.

Besides the fact that the binding theory only allows null objects in non-topic constructions to be interpreted as personal pronouns, there is an additional reason for positing null objects as personal pronouns in this case: it brings out the symmetric behavior of null objects and null subjects, (which are also interpreted independently as personal pronouns), with respect to coindexing with a superordinate subject, (as shown in in examples (7) and (4)-(5), (8)-(14)). In contrast, it is difficult for Huang to account for this symmetric behavior by positing that null objects in non-topic constructions are traces. Furthermore, this analysis not only adheres to the binding theory and accounts for a subject-object symmetry, but also accounts for all of the relevant data given in section 3.2. (including sentences interpreted with or without previous discourses).

4. Topic constructions.

4.1. Two views.

There have been thought to be two general types of topic constructions: Chinese-style and English-style, the first illustrated by a Chinese example in (15), and the second by an English example in (16).

(15) Zhongguo, renkou hen duo.
China, population very many
'China, the population is very great.'

(16) Mary$_i$, I like t_i.

The crucial difference between Chinese-style and English-style topicalization is in the relationship between the topic and the comment S. In Chinese-style topicalization, the comment S is necessarily related (at least pragmatically) to the topic, and may (but is not required to) contain a (possibly empty) NP that is anaphoric to the topic. In English-style topicalization, on the other hand, a (possibly empty) NP in the comment S is syntactically dependent on the topic.

The type of construction that is of interest here is where a null object appears in the comment S, as in (17) below.

(17) [Neiben shu]$_i$, duguo e_i de ren hen duo.
[that-CL book]$_i$ read-ASP e_i DE person very many
'That book, there are many people who have read [it].'

When null objects appear in languages like English, which lack null pronominals, an analysis of English-style topicalization is presumably the only option. But for Chinese, the interpretation of the null object, and consequently the configuration in which it is interpreted, is not so clear. Specifically, the construction in (17) may be analyzed as either Chinese-style or English-style topicalization, where the relationship between the null object and the topic is either anaphoric (where the null object is a pronoun that is coindexed with the topic), or non-anaphoric (where the null object is a trace coindexed with the topic), respectively.

As with non-topic constructions, there is a dispute over the correct analysis of examples like (17). Huang (1984) believes that an example like (17) is an instance of English-style topicalization, in which the object moves into topic position and leaves a variable which is bound by it. Xu and Langendoen (1985), on the other hand, believe that Chinese only has Chinese-style topicalization, where there is either an anaphoric dependency or no dependency at all.[6]

Let us now translate the two styles of topicalization, on which these two positions are based, into HPSG terms.

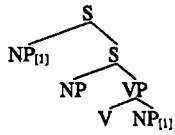
Chinese-style topicalization in HPSG can be analyzed in terms of a new constituent-structure type, called topic-head. The following is a characterization of a Topic-Head Schema.

Topic-Head Schema:

X"	------>	Y"	,	X" [SUBJ < >, COMPS < >]
		TOPIC		HEAD

A special case of Chinese-style topicalization, as mentioned above, is when there is a pronoun, overt or null, in the comment S which is anaphoric with the topic, as shown in the tree a. below.

a.



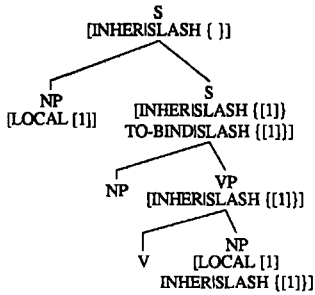
English-style topicalization in HPSG has standardly been analyzed in terms of a filler/gap configuration, in which there is a trace that is coindexed with the extracted topic, and whose reference-type depends on the reference-type of the topic. The Filler-Head Schema and a corresponding tree are shown below.

[6] They do not, in fact, exclude the possibility of a movement analysis like Huang's, but only under the condition that the object is still considered to be a pronoun.

Filler-Head Schema:

X -----> [LOCAL [1]] , S [fin, INHER/SLASH {[1],...}, TO-BIND/SLASH {[1]}]
FILLER HEAD

b.



In order to determine which analysis a null object should have, we must consider more data and explore the binding possibilities of the null object.

4.2. Data.

There are many grammatical examples where the null object (which is positioned inside a relative clause) is coindexed with a topic, as in (17). I evaluated both single topic constructions (where there is one topic which is coindexed with a null object) and double topic constructions (where there are two topics, each being coindexed with two distinct null objects), all of which have relative clauses in which the null object is embedded.[7] Furthermore, there are two types of relatives for both single and double topic constructions: what I call subject and object relatives. Subject relatives are cases where the null object is in a relative clause whose subject is the relativized position. Object relatives are cases where the null object is in a relative clause where an object (other than the null object) is the relativized position. In addition, for the single topic constructions, the position of NPs which contain these relative clauses can vary, whether it be the matrix or embedded subject, or the matrix or embedded object. For the double topic constructions, the position of null objects which are coindexed with second topics (the relative clauses) can vary, whether it be the embedded subject, or the matrix or embedded object, (it cannot be a matrix subject). The data is presented below according to subject and object relatives, where the a. examples are single topic constructions and the (b) examples are double topic constructions. Also, the sentential position of both the relative clauses in the a. examples and the second null objects (e_k) in the b. examples is made explicit.

[7] Besides the fact that null objects often occur in relative clauses in Mandarin, there is no significant theoretical reason for my chosing data that involves relative clauses. I plan to address simpler constructions in the future.

Subject relatives:
Matrix subject:

(18) [Neiben shu]$_i$, neng dudong e_i de ren bu duo.
[that-CL book]$_i$ able-to read-understand e_i DE people not many
'That book, there aren't many people who can understand [it].'

Embedded subject:

(19) a. [Neiben shu]$_i$, wo tingshuo neng dudong e_i de ren bu duo.
[that-CL book]$_i$ I hear able-to read-understand e_i DE people not many
'That book, I hear that there aren't many people who can understand [it].'

b. [Neiben shu]$_i$, [neng dudong e_i de ren]$_k$, wo tingshuo e_k bu duo.
[that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I hear e_k not many
'That book, people who can understand [it], I hear there aren't many.'

Matrix object:

(20) a. [Neiben shu]$_i$, wo conglai mei jianguo neng dudong e_i de ren.
[that-CL book]$_i$ I always not meet able-to read-understand e_i DE people
'That book, I've never met a person/anyone who could understand [it].'

b. [Neiben shu]$_i$, [neng dudong e_i de ren]$_k$, wo conglai mei jianguo
[that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I always not meet
e_k.
e_k
'That book, someone/people who could understand [it], I've never met [her/them].'

Embedded object:

(21) a. [Neiben shu]$_i$, wo tingshuo Li Jiaoshou conglai mei jianguo neng dudong
[that-CL book]$_i$ I hear Professor Li always not meet able-to read-
e_i de ren.
understand e_i DE people
'That book, I hear Professor Li has never met a person/anyone who could understand [it].'

b. [Neiben shu]$_i$, [neng dudong e_i de ren]$_k$, wo tingshuo Li Jiaoshou
[that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I hear Professor Li
conglai mei jianguo e_k.
always not meet e_k
'That book, someone/people who could understand [it], I hear Professor Li has never met [him/them].'

Object relatives:
Matrix subject:

(22) [Zhei zhong wenti]$_i$, Xiaomei jiejue e_i de banfa zui hao.
[this kind problem]$_i$ Xiaomei solve e_i DE method best good
'This kind of problem, a method/methods that Xiaomei used to solve [it] is/are the best.'

Embedded subject:

(23) a. [Zhei zhong wenti]$_i$, Zhangsan shuo Li Jiaoshou jiejue e_i de banfa zui hao.
[this kind problem]$_i$ Zhangsan say Professor Li solve e_i DE method best good
'This kind of problem, Zhangsan says that a method/methods that Professor Li used to solve [it] is/are the best.'

b. [Zhei zhong wenti]$_i$ [Li Jiaoshou jiejue e_i de banfa]$_k$, Zhangsan shuo e_k zui
[this kind problem]$_i$ [Professor Li solve e_i DE method]$_k$ Zhangsan say e_k best
hao.
good
'This kind of problem, a method/methods that Professor Li used to solve [it], Zhangsan says [it/they] is/are the best.'

Matrix object:

(24) a. [Zhei zhong wenti]$_i$, wo zao yi xuehui le Li Jiaoshou jiejue e_i de banfa.
[this kind problem]$_i$ I long-ago master ASP Professor Li solve e_i DE method
'This kind of problem, I've long ago mastered a method/methods that Professor Li used to solve [it].'

b. [Zhei zhong wenti]$_i$, [Li Jiaoshou jiejue e_i de banfa]$_k$, wo zaoyi xuehui le
[this kind problem]$_i$ [Professor Li solve e_i DE method]$_k$ I long-ago master ASP
e_k.
e_k
'This kind of problem, a method/methods that Professor Li used to solve [it], I mastered [it/them] a long time ago.'

Embedded object:

(25) a. [Zhei zhong wenti]$_i$, wo tingshuo Xiaomei zao yi xuehui le Li Jiaoshou jiejue
[this kind problem]$_i$ I hear Xiaomei long-ago master ASP Professor Li solve
e_i de banfa.
e_i DE method
'This kind of problem, I hear that Xiaomei long-ago mastered a method/methods that Professor Li used to solve [it].'

b. [Zhei zhong wenti]$_i$, [Li Jiaoshou jiejue e_i de banfa]$_k$, wo tingshuo Xiaomei
[this kind problem]$_i$ [Professor Li solve e_i DE method]$_k$ I hear Xiaomei
zao yi xuehui le e_k.
long-ago master ASP e_k
'This kind of problem, a method/methods that Professor Li used to solve [it], I hear that Xiaomei mastered [it/them] a long time ago.'

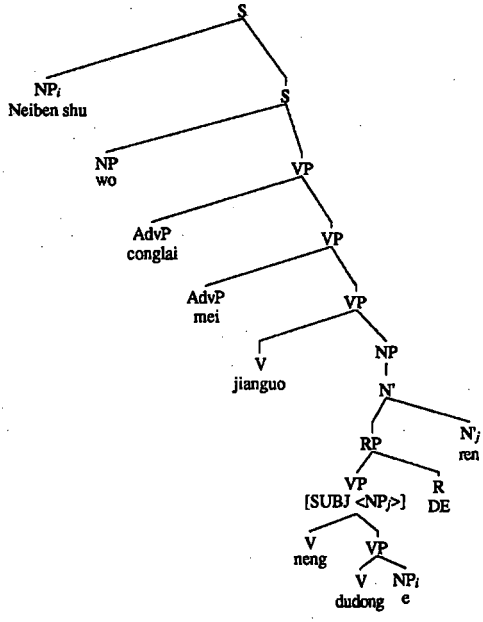
All of these examples, as I mentioned, are grammatical according to my informants. The double topic constructions, however, aren't as acceptable as the single topic constructions. (Just as for the non-topic examples, the grammaticality judgments of the particular binding relationships in these examples do not rule out other binding relationships.)

Below is an illustration of the configuration of each type of construction: subject relative (single topic), subject relative (double topic), object relative (single topic), and object relative (double topic), respectively, where the position of the relative clauses in the single topic constructions and the position of the second null object in the double topic constructions is the matrix object (this is done without positing either kind of topicalization):

(a) subject relative (single topic), (matrix object), e.g. (20a):

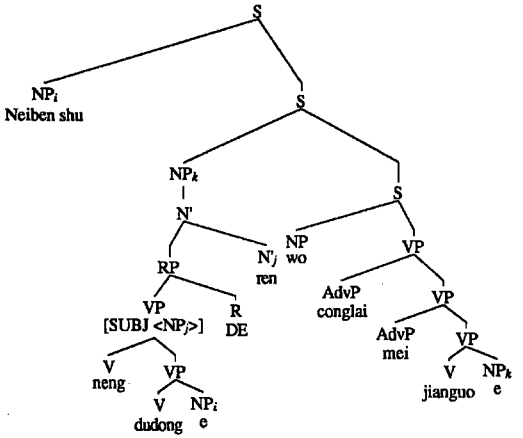
[Neiben shu]$_i$,	wo	conglai	mei	jianguo	neng	dudong		e_i	de	ren.
[that-CL book]$_i$	I	always	not	meet	able-to	read-understand		e_i	DE	people

'That book, I've never met a person/anyone who could understand [it].'



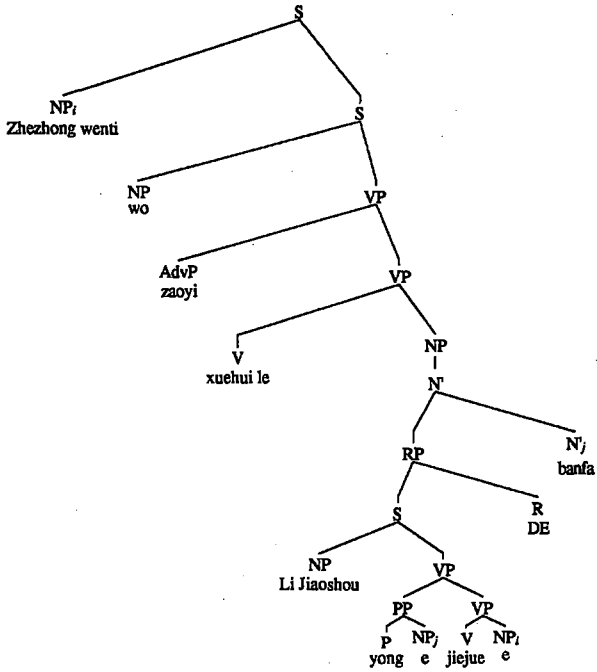
(b) subject relative (double topic), (matrix object), e.g. (20b):

[Neiben shu]$_i$, [neng dudong e_i de ren]$_k$, wo conglai mei jianguo e_k.
[that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I always not meet e_k
'That book, someone/people who could understand [it], I've never met [her/them].'



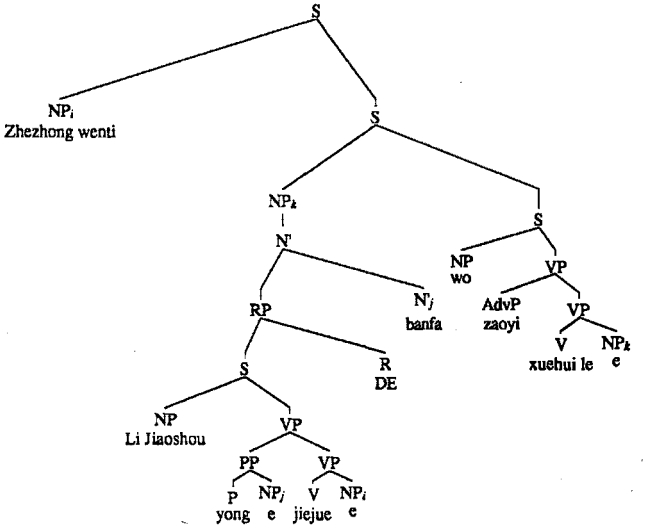
(c) object relative (single topic), (matrix object), e.g. (24a):

[Zhei zhong wenti]$_i$, wo zao yi xuehui le Li Jiaoshou jiejue e_i de banfa.
[this kind problem]$_i$ I long-ago master ASP Professor Li solve e_i DE method
'This kind of problem, I've long ago mastered a method/methods that Professor Li used to solve [it].'



(d) object relative (double topic), (matrix object), e.g. (24b):

[Zhei zhong wenti]$_i$, [Li Jiaoshou jiejue e_i de banfa]$_k$, wo zaoyi xuehui le
[this kind problem]-i, [Professor Li solve e_i DE method]$_k$ I long-ago master ASP
e_k.
e_k
'This kind of problem, a method/methods that Professor Li used to solve [it], I mastered a long time ago.'



For the subject relatives, the *DE* relativizer is the output of the Subject Extraction Lexical Rule (SELR) of Pollard and Sag (in press), which accounts for subject extraction from a relative clause.[8] For the object relatives, I interpret *yong* as a preposition, as proposed by

[8] Below are the following: 1) the SELR, and 2) the lexical entry for *DE*, (which is the output of the SELR).

Chao (1968)[9], and I assume that *yong* deletes when its complement is relativized, perhaps by some phonological process. (This is mere speculation, and is not crucial to my analysis of null objects.) Furthermore, the *DE* relativizer in the object relatives is different from *DE* in the subject relatives, since it subcategorizes for an S and not a VP, and can serve as input to the SELR.[10]

The general structure of constructions where the position of the relative clauses for the single topic constructions (and of the second null object for the double topic constructions) is not the matrix object should be clear from these illustrations.

---

1)

$$[\text{SUBCAT} < \text{Y},\ldots, \text{S}[\textit{unmarked}],\ldots >]$$

$$\Downarrow$$

$$\begin{bmatrix} \text{INHER} \mid \text{SLASH} \ \{[1]\} \\ \text{SUBCAT} < \text{Y},\ldots, \begin{bmatrix} \text{SUBCAT} < \overset{\text{VP}}{[\text{LOC}\ [1]]} > \\ \text{INHER} \mid \text{SLASH} \ \{\ \} \end{bmatrix} ,\ldots > \end{bmatrix}$$

2)

$$\begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD rltvzr} \left[\text{MOD N' [TO-BIND} \mid \text{REL } \{[1]\}\right] : \begin{bmatrix} \text{INDEX } [1] \\ \text{RESTR } [3] \end{bmatrix} \right] \\ \text{SUBCAT} <[7]\ \text{N'[INHER} \mid \text{REL } \{[1]\}], \text{VP[fin, SUBCAT} <[7]\ [\text{LOC } [4]]>] : [5] > \end{bmatrix} \\ \text{CONTENT npro} \begin{bmatrix} \text{INDEX } [1] \\ \text{RESTR } \{[5]\} \cup [3] \end{bmatrix} \end{bmatrix} \\ \text{NONLOCAL} \begin{bmatrix} \text{TO-BIND} \mid \text{SLASH } \{[4]\} \\ \text{INHER} \mid \text{SLASH } \{[4]\} \end{bmatrix} \end{bmatrix}$$

[9] Besides its use as a preposition, *yong* can also be interpreted as a verb, as in: *Wo yong le neige banfa* ('I used that method'). There are also different possible analyses of the PP when *yong* is interpreted as a preposition. For the purposes of my analysis, I assume it is an adjunct.

[10] The following is the lexical entry for the *DE* relativizer (which could be input to the SELR):

$$\begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD rltvzr} \left[\text{MOD N' [TO-BIND} \mid \text{REL } \{[1]\}\right] : \begin{bmatrix} \text{INDEX } [1] \\ \text{RESTR } [3] \end{bmatrix} \right] \\ \text{SUBCAT} <[\text{LOC } [4], \text{INHER} \mid \text{REL } \{[1]\}], \text{S[fin, INHER} \mid \text{SLASH } \{[4]\}] : [5] > \end{bmatrix} \\ \text{CONTENT npro} \begin{bmatrix} \text{INDEX } [1] \\ \text{RESTR } \{[5]\} \cup [3] \end{bmatrix} \end{bmatrix} \\ \text{NONLOCAL} \mid \text{TO-BIND} \mid \text{SLASH } \{[4]\} \end{bmatrix}$$

4.3. Further data.

There are a few points to note about data that is not presented above. All of the data in 4.2. have relativized NPs which are indefinite, but additional data with relativized NPs which are definite were also employed in the informant work. This additional data was somewhat problematic, in that the judgments varied across informants more, and in that a few examples were quite marginal. Below are a few examples, which are less acceptable than their indefinite counterparts, (26) corresponding to (18), (27) to (20a), (28) to (22), and (29) to (24a).

(26) ?[Neiben shu]$_i$, xie e_i de ren ceng jianguo Sun Zhong-san yi mian.
[that-CL book]$_i$ write e_i DE person once meet-ASP Sun Yat-sen one-CL
'That book, the person/the people who wrote [it] met Sun Yat-sen once.'

(27) ?[Neiben shu]$_i$, wo ceng jianguo xie e_i de ren yi mian.
[that-CL book]$_i$ I once meet-ASP write e_i DE person one-CL
'That book, I met the person/the people who wrote [it] once.'

(28) ?[Zhei zhong wenti]$_i$, Zhangsan jiejue e_i de neige banfa zui hao.
[this kind problem]$_i$, Zhangsan solve e_i DE that-CL method best good
'This kind of problem, that method which Zhangsan used to solve [it] is the best.'

(29) ?[Zhei zhong wenti]$_i$, wo zui xihuan Zhangsan jiejue e_i de neige banfa.
[this kind problem]$_i$ I best like Zhangsan solve e_i DE that-CL method
'This kind of problem, I like that method which Zhangsan used to solve [it] the best.'

Since the only difference between this set of data and the one shown in 4.2. is definiteness, the marginality of this set of data is assumed to be due to definiteness. This would suggest that relativization of definite NPs in Chinese is somehow marked. Campos (1986) also suggests that there may be a difference in grammaticality between definite and indefinite NPs.

In addition to the data above, examples with null subjects instead of null objects were also employed, such as the following:

(30) *[Li Jiaoshou]$_i$, e_i xie de shu bu shao.
[Professor Li]$_i$ e_i write DE book not few
'Professor Li, [she] has written quite a few books.'

(31) *Zhangsan$_i$, e_i jiejue zheizhong wenti de banfa hen duo.
Zhangsan$_i$ e_i solve this kind problem DE method very many
'Zhangsan, there are many methods that [he] used to solve this kind of problem.'

(32) *[Li Jiaoshou]$_i$, wo mei duguo e_i xie de shu.
[Professor Li]$_i$ I not read-ASP e_i write DE book
'Professor Li, I've never read the book/any books [she] has written.'

(33) *Xiaomei$_i$, wo hen xihuan e_i jiejue zheizhong wenti de banfa.
Xiaomei$_i$ I very like e_i solve this kind problem DE method
'Xiaomei, I like a method/methods that [she] uses to solve this kind of problem.'

It is beyond the scope of this paper to completely analyze that data. But there was a significant result from the data that should be mentioned: null subjects cannot be coindexed with topics in these constructions; all of the examples in the data were considered ungrammatical when there was enough pause after the topic (to indicate the

existence of a topic). As we have seen, this is in strong contrast to null objects, which can appear in these constructions.[11] It seems clear that the ungrammaticality of (30)-(33) should be attributed to a failure of coindexing null subjects and topics, for two reasons. First, the ungrammaticality cannot be attributed to a null subject appearing in a relative clause (whose extracted position is an object), since this type of relative extraction without topics is fine, as shown in (34).

(34) Li Jiaoshou xie de shu bu shao.
Professor Li write DE book not few
'There are many books written by Professor Li.'

This sentence is interpreted without a null subject at all, due to the topic not appearing. (This can be clear to the native speaker through prosody.)

Secondly, there is a difference in grammaticality between null subjects and null objects in topic constructions without relative clauses, as shown in (35) and (36).

(35) *[Li Jiaoshou]$_i$, e_i bu xihuan wo.
[Professor Li]$_i$ e_i not like me
'Professor Li, [he] doesn't like me.'

(36) [Li Jiaoshou]$_i$, wo bu xihuan e_i.
[Professor Li]$_i$ I not like e_i
'Professor Li, I don't like [him].'

In conclusion, there is a clear asymmetry between null subjects and null objects with respect to coindexation with a topic.

4.4. Analysis.

Let us reconsider example (20a), repeated below, in order to identify the null object according to the binding theory.

(20) a. [Neiben shu]$_i$, wo$_l$ conglai mei jianguo [neng dudong e_i de ren$_j$]$_k$.
[that-CL book]$_i$ I$_l$ always not meet [able-to read-understand e_i DE people$_j$]$_k$
'That book, I've never met a person/anyone who could understand [it].'

The SUBCAT values for *dudong* is as follows:

dudong: [SUBCAT < NP$_j$, NP$_i$ >]
jianguo: [SUBCAT < NP$_l$ NP$_k$ >]

Unlike in section 3.3, the binding theory here does not motivate a choice for either npro or ppro. The e_i null object is locally o-free, since the other NP in *dudong*'s SUBCAT list (*ren*) does not bind it. In fact, it is not o-bound at all, since the NP which it is coindexed with is not on any SUBCAT list. Therefore, the null object can be interpreted as a ppro or an npro.

How, then, do we decide between pronoun and trace for identifying null objects in these topic constructions? At first glance, one might assume them to be npros in a filler/gap construction, as in English. On the other hand, the observation that null objects in non-

[11] This is contrary to Huang (1984) who says examples like these are grammatical, and thus seems to suggest that there is no asymmetry between null subjects and null objects in topic constructions. The determination of the reason why our judgments differ will have to await future research.

topic constructions are personal pronouns gives support for a (consistent) pronominal analysis. Nevertheless, I want to suggest that null objects are nonpronouns, for the following reason: if null objects in topic constructions were pronouns, then we should expect them to appear as subjects in the same kind of topic constructions, (after all, subjects are thought by (these same) researchers to be pronouns in some cases). But, as I mentioned in 4.3., null subjects cannot appear in these constructions. It would be very difficult to explain the null subject data by treating null objects here as pronouns. On the other hand, if null objects in these topic constructions were analyzed as traces, it would be quite easy to explain the asymmetry between subjects and objects (for example between (20a) and (32)): topic constructions have filler/gap configurations, where, in some cases, objects can be extracted as topics, but subjects cannot. By accounting for the subject-object asymmetry via a trace analysis, I also bring out a contrast in the behavior of null objects and null subjects between non-topic constructions and topic constructions, where they are personal pronouns when they act alike (in non-topic constructions, with respect to examples interpreted with appropriate contexts), and where they are traces when they act differently (in topic constructions). In this sense, I assume that pronouns which have topic antecedents must be overt.[12]

As for the particular analysis of trace in HPSG, it is a sign (a linguistic expression), whose LOCAL value is identical with that of the filler (here the topic), and are passed up the tree as the SLASH value. (The configuration for (20a) should be straight-forward from this information and the general filler/gap tree given in 4.1.)

In conclusion, there is English-style topicalization in Chinese in addition to Chinese-style topicalization, in the sense that empty categories can show up in a comment S. This kind of topicalization should have a filler/gap configuration. This claim supports Huang, who also believes that Chinese has both Chinese-style and English-style topicalization. On the other hand, I disagree with Xu and Langendoen's (1986) pronominal analysis, because such an analysis would be difficult to use to explain the null subject data. They do not mention null subjects in their article, and thus see no problem with the subject-object asymmetry.

5. Discourse reference.

5.1. Two views.

The last type of construction that I will consider is a discourse construction, where the antecedent of the null object, which itself is inside a relative clause, is a referent which is located in a previous utterance of a discourse. The only one of the researchers discussed so far who has data that deals with these constructions is Huang (1982). As discussed above, he claims that the only distribution of null objects is as variables in topic constructions, and in order to account for the grammaticality of discourse reference, he posits a null topic. This works just as his analysis of non-topic constructions.

Xu claims that the null object is a pronoun, and that it is null because of a discourse deletion mechanism (the same kind of thing Huang suggests for the deletion of the topic). Beyond that, he says there is no real syntactic significance to a discourse construction.

I will agree with Xu that the null object here is a pronoun, and not adopt a null-topic analysis such as Huang's, which seems unnecessary: why say there is an existing topic that is nevertheless invisible when you can just say there is no topic at all?

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[12] This brings up an interesting asymmetry in the behavior of overt and null anaphora in Mandarin. Future investigation of this issue would be interesting.

5.2. Data.

I evaluated the same two kinds of relatives, subject relatives and object relatives, and their paradigm, as used in 4.2.[13] The only difference between the examples in this section and 4.2. is that the NP coindexed with the null object is in a previous sentence of the discourse, instead of being the topic of the same sentence. This kind of data was used instead of examples that had simpler structure in order to make a clearer contrast with the topic constructions.

Similar to the topic constructions, this data is presented below according to subject and oblique relatives, where there is a varying position for the a. examples, (the relative clause in a non-topic construction), and the b. examples, (the second null object in a single topic construction).

Subject relatives:
Matrix subject:

(37) [Neiben shu]$_i$ bu rongyi kan. Neng dudong e_i de ren bu duo.
[that-CL book]$_i$ not easy read. able-to read-understand e_i DE people not many
'That book is hard to read. There aren't many people who can understand [it].'

Embedded subject:

(38) a. [Neiben shu]$_i$ bu rongyi kan. Wo tingshuo neng dudong e_i de
[that-CL book]$_i$ not easy read. I hear able-to read-understand e_i DE
ren bu duo.
people not many
'That book is hard to read. I hear that there aren't many people who can understand [it].'

b. [Neiben shu]$_i$ bu rongyi kan. [Neng dudong e_i de ren]$_k$, wo
[that-CL book]$_i$ not easy read. [able-to read-understand e_i DE people]$_k$ I
tingshuo e_k bu duo.
hear e_k not many
'That book is hard to read. People who can understand [it], I hear there aren't many.'

Matrix object:

(39) a. [Neiben shu]$_i$ bu rongyi kan. Wo conglai mei jianguo neng dudong
[that-CL book]$_i$ not easy read. I always not meet able-to read-understand
e_i de ren.
e_i DE people
'That book is hard to read. I've never met a person/anyone who could understand [it].'

b. [Neiben shu]$_i$ bu rongyi kan. [Neng dudong e_i de ren]$_k$, wo
[that-CL book]$_i$ not easy read. [able-to read-understand e_i DE people]$_k$ I
conglai mei jianguo e_k.
always not meet e_k
'That book is hard to read. Someone/anyone who could understand [it], I've never met [her/them].'

[13] Just as for the data in 4.2., the emphasis on relative clauses here is not essential to my analysis.

Embedded object:

(40) a. [Neiben shu]$_i$ bu rongyi kan. Wo tingshuo Li Jiaoshou conglai mei jianguo
[that-CL book]$_i$ not easy read. I hear Professor Li always not meet
neng dudong e_i de ren.
able-to read-understand e_i DE people
'That book is hard to read. I hear Professor Li has never met a person/anyone who could understand [it].'

b. [Neiben shu]$_i$ bu rongyi kan. [Neng dudong e_i de ren]$_k$, wo
[that-CL book]$_i$ not easy read. [able-to read-understand e_i DE people]$_k$ I
tingshuo Li Jiaoshou conglai mei jianguo e_k.
hear Professor Li always not meet e_k
'That book is hard to read. Someone/anyone who could understand [it], I hear Professor Li has never met [him/them].'

Object relatives:
Matrix subject:

(41) [Zhei zhong wenti]$_i$ hen yanzhong. Xiaomei jiejue e_i de banfa zui hao.
[this kind problem]$_i$ very serious. Xiaomei solve e_i DE method best good
'This kind of problem is very serious. A method/methods that Xiaomei used to solve [it] is/are the best.'

Embedded subject:

(42) a. [Zhei zhong wenti]$_i$ hen yanzhong. Zhangsan shuo Li Jiaoshou jiejue e_i de
[this kind problem]$_i$ very serious. Zhangsan say Professor Li solve e_i DE
banfa zui hao.
method best good
'This kind of problem is very serious. Zhangsan says that a method/methods that Professor Li used to solve [it] is/are the best.'

b. [Zhei zhong wenti]$_i$ hen yanzhong. [Li Jiaoshou jiejue e_i de banfa]$_k$, Zhangsan
[this kind problem]$_i$ very serious. [Professor Li solve e_i DE method]$_k$ Zhangsan
shuo e_k zui hao.
say e_k best good
'This kind of problem is very serious. A method/methods that Professor Li used to solve [it], Zhangsan says [it/they] is/are the best.'

Matrix object:

(43) a. [Zhei zhong wenti]$_i$ hen yanzhong. Wo zao yi xuehui le Li Jiaoshou jiejue
[this kind problem]$_i$ very serious. I long-ago master ASP Professor Li solve
e_i de banfa.
e_i DE method
'This kind of method is very serious. A long time ago I mastered a method/methods that Professor Li used to solve [it].'

b. [Zhei zhong wenti]$_i$ hen yanzhong. [Li Jiaoshou jiejue e_i de banfa]$_k$, wo zaoyi
[this kind problem]$_i$ very serious. [Professor Li solve e_i DE method]$_k$ I long-
ago xuehui e_k le.
master e_k ASP
'This kind of method is very serious. A method/methods that Professor Li used to solve [it], I mastered [it/them] a long time ago.'

Embedded object:

(44) a. [Zhei zhong wenti]$_i$ hen yanzhong. Wo tingshuo Xiaomei zao yi xuehui le
[this kind problem]$_i$ very serious. I hear Xiaomei long-ago master ASP
Li Jiaoshou jiejue e_i de banfa.
Professor Li solve e_i DE method
'This kind of problem is very serious. I hear that Xiaomei long-ago mastered a method/methods that Professor Li used to solve [it] .'

b. [Zhei zhong wenti]$_i$ hen yanzhong. [Li Jiaoshou jiejue e_i de banfa]$_k$, wo
[this kind problem]$_i$ very serious. [Professor Li solve e_i DE method]$_k$ I
tingshuo Xiaomei zaoyi xuehui e_k le.
hear Xiaomei long-ago master e_k ASP
'This kind of problem is very serious. A method/methods that Professor Li used to solve [it], I hear that Xiaomei mastered [it/them] a long time ago.'

These examples were uniformly good across speakers, even more so than the topic constructions were.[14]

5.3. Analysis.

As in the non-topic constructions, the null object here is a personal pronoun. Consider, for example, (39b) (where the second object is the matrix object), which is shown again here.

(39) b. [Neiben shu]$_i$ bu rongyi kan. [neng dudong e_i de ren$_j$]$_k$, wo$_l$
[that-CL book]$_i$ not easy read. [able-to read-understand e_i DE people$_j$]$_k$ I$_l$
conglai mei jianguo e_k.
always not meet e_k
'That book is hard to read. Someone/anyone who could understand [it], I've never met [her/them].'

The SUBCAT values for *dudong* and *jianguo* are as follows:

dudong: [SUBCAT < NP$_j$, NP$_i$ >]
jianguo: [SUBCAT < NP$_l$, NP$_k$ >]

The e_i null object is locally o-free, since the other NP in *dudong*'s SUBCAT list (*ren*) does not bind it. Actually, it is not o-bound at all, since the NP which it is coindexed with is not on any SUBCAT list, and in fact is not even in the same utterance. Therefore, the null object can be interpreted as a ppro. The null object could also be a npro, since it is o-free. Now, for the e_k null object: just like e_k in (20a), it is locally o-free, since the other NP (*wo*) in the SUBCAT of *jianguo* does not bind it. And, like e_i, e_k is not o-bound at all, since NP$_k$ does not show up on any SUBCAT list. So, e_k can be a ppro. But it can also be an npro, since it is o-free.

Even though the e_i null object can be interpreted as an npro according to the HPSG binding theory alone, it nevertheless cannot be interpreted as such in general HPSG theory. This is due to the independent fact that a null non-pronoun is seen as a trace which has its referent in an *intrasentential* filler/gap construction. The nature of filler/gap

[14] For this difference in acceptability, there may be the following explanation: Xu (1986) suggests that there may be a processing difficulty for certain topic constructions, based on the correlation between a nested dependency (all of the examples have cross-referenced anaphora) and pragmatic factors on anaphora.

constructions makes it impossible to determine the binding relationship between a trace and a referential NP in a previous sentence. Therefore the e_i null object here is a ppro (and not an npro). As for the e_k null object, it is an npro, for the same reasoning given for the e_i in (20a) in 4.4.

The null object pronoun (e_i) would be treated in the theory in the same way as in the case of the non-topic constructions, and the null object non-pronoun (e_k) would be treated in the same way as in the case of the topic constructions. The configuration of the first comment sentence in (20a) would look like the topic construction in the second sentence of (39b), except that there is a ppro in the relative clause of (39b), where there is a trace in that of (20a). (See the filler/gap configuration shown in 4.1.)

To cover the range of data, I will look at three more examples, all of which have matrix object position and corresponding tree structures in 4.2. These examples are (39a) and (43a, b), which are shown again here.

(39) a. [Neiben shu]$_i$ bu rongyi kan. Wo$_l$ conglai mei jianguo [neng dudong
[that-CL book]$_i$ not easy read. I$_l$ always not meet [able-to read-understand
e_i de ren$_j$]$_k$.
e_i DE people$_j$]$_k$
'That book is hard to read. I've never met someone/anyone who could understand [it].'

(43) a. [Zhei zhong wenti]$_i$ hen yanzhong. Wo zao yi xuehui le [Li Jiaoshou]$_l$
[this kind problem]$_i$ very serious. I long-ago master ASP [Professor Li]$_l$
jiejue e_i de banfa.
solve e_i DE method
'This kind of problem is very serious. A long time ago I mastered a method/methods that Professor Li used to solve [it].'

b. [Zhei zhong wenti]$_i$ hen yanzhong. [[Li Jiaoshou]$_l$ jiejue e_i de banfa]$_k$, wo
[this kind problem]$_i$ very serious. [[Professor Li]$_l$ solve e_i DE method]$_k$ I
zaoyi xuehui e_k le.
long-ago master e_k ASP
'This kind of problem is very serious. A method/methods that Professor Li used to solve [it], I mastered [it/them] a long time ago.'

jiejue: [SUBCAT < NP_i, NP_j >]

The e_i in each of these three examples is a personal pronoun for the same reasoning given for the e_i of (39b). ((39a) is analyzed with respect to the SUBCAT given in the discussion of (39b), and (43a, b) is analyzed with respect to the *jiejue* SUBCAT just above). The e_k of (43b) is a nonpronoun, for the same reasoning given for the e_k in (39b) and (20a).

Besides the fact that HPSG only allows these constructions to be interpreted as having null-object personal pronouns, there is another reason for positing null objects as personal pronouns in this case: by positing null objects as personal pronouns, I bring out the symmetric behavior of null objects and null subjects, where a null subject is interpreted as a personal pronoun (for the same reasoning as the null objects) in grammatical examples like (45) below.

(45) [Li Jiaoshou]$_i$ you ming. e_i xie de shu bu shao.
[Professor Li]$_i$ have fame e_i write DE book not few
'Professor Li is well known. She has written quite a few books.'

This evidence (that both null objects and null subjects are pronouns in discourse constructions) reflects the symmetric behavior between null subjects and null objects, as in the non-topic constructions. It also interestingly contrasts with the asymmetry between

null objects and null subjects when they both are traces in topic constructions.

6. Conclusions.

Now, a revision of the NP typology for Chinese can be made.

HPSG REF-TYPE	ppronoun	nonpronoun	zpronoun
OVERT	ta	Xiaomei	ziji
EMPTY	obj bound by matrix subj or discourse referent	obj bound by topic	--

This new typology indicates that null objects in Mandarin have a wider distribution than has been suggested to date. In coming to this conclusion, I do not reject the whole analysis of either Huang or Xu, but side with both on different issues. Moreover, the typology suggests that null objects do not always have the same reference-type, as has previously been argued. Thus, with respect to non-topic and discourse constructions, Chinese belongs, as suggested by Xu (1986) and Rizzi (1986), in a typology of null-object-drop languages. Furthermore, this analysis, unlike those of Huang and Xu, brings out the relative behavior of null subjects and objects, where their asymmetric behavior is diagnostic for trace-hood and their symmetric behavior for pronoun-hood.

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